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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/821,323	04/09/2004	Yosuke Hosoya	09792909-5853	9692

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EXAMINER	
ECHELMEYER, ALIX ELIZABETH	
ART UNIT	PAPER NUMBER
1729	

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12/07/2010	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/821,323	HOSOYA ET AL.	
	Examiner	Art Unit	
	Alix Elizabeth Echelmeyer	1729	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *12 November 2010*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1 and 4-6* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1 and 4-6* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. This Office Action is in response to the amendment filed November 12, 2010. Claims 1 and 5 are amended. Claims 1 and 4-6 are pending and are rejected finally for the reasons given below.

Claim Interpretation

2. Claim 6 contains product by process limitations to the way the coating layer is attached to the inner particle. The product-by-process limitations are not given patentable weight since the courts have held that patentability is based on a product itself, even if the prior art product is made by a different process (see MPEP 2113, In re Thorpe, 227 USPQ 964, (CAFC 1985), In re Brown, 173 USPQ 685 (CCPA 1972), and In re Marosi, 218 USPQ 289, 292-293 (CAFC 1983)).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1, 5, and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Oesten et al. (US 2001/0046628 A1) in view of Kawai et al. (US 2003/0152839) and Spitler et al. (US 2004/0197657).

Oesten et al. disclose a coated lithium nickel mixed oxide particle and the method of making the particle for use as the cathode material in an electrochemical cell. The coated lithium mixed oxide particles are used to improve the properties of the electrochemical cell. The particle core is a lithium mixed oxide containing nickel ([0032]) such as $Li_xNi_yMn_{2-y}O_4$. The particle coating is a metal oxide ([0033], [0034]). The use of titanium oxide as the particle coating is disclosed ([0034]).

The lithium mixed oxide particles of the active material of Oesten et al. correspond to the inner particle of lithium and nickel oxide in claims 1 and 5 of the instant application. The particle coating of, for example, titanium oxide as taught by Oesten et al. corresponds to the outer coating, an oxide of lithium and titanium, of the instant application. As in the instant application, the titanium oxide of Oesten et al. is coated on particles of the lithium mixed oxide containing nickel.

Oesten et al. fail to teach explicitly that the coating layer is homogenous. The examiner finds that such a limitation is inherently taught by Oesten et al. Oesten et al. teach positive active material compound particles including in inner lithium oxide material having a coating of a lithium-containing metal oxide ([0138]). Since the only material used to make these particles is the metal-containing oxide precursor, the skilled artisan will easily see that the coating is homogeneous.

With further regard to claims 1 and 5, Oesten et al. do not explicitly teach that the weight ratio of the first compound oxide to the second compound oxide is between 96:4 and 65:35. Oesten et al. do teach that the weight ratio of the coating metal oxide to the lithium mixed oxide particles is from 0.01 to 20 percent. The weight ratio of the alkali metal to the lithium mixed oxide particles in the cathode is from 0.01 to 10 percent. It would have been obvious to one having ordinary skill in the art at the time the invention was made to optimize the weight relationship between the core oxide material and the coating oxide material such as taught by Oesten et al. in order to provide a thick enough coating that inhibits the undesirable reactions of the acid with the electrode material. It has been held that where general conditions of a claim are disclosed in the prior art, discovering the optimum or workable range involves only routine skill in the art. In re Aller, 105 USPQ 233. MPEP 2144.05 (IIB). Additionally, it has been held that using a known technique of improving a similar device in the same way is predictable to the skilled artisan. MPEP 2141 III.

Regarding claim 6, Oesten et al. teach a particle having an inner particle and an outer coating. As discussed above, the method by which the particle is made is not given patentable weight.

As for claims 1 and 5, Oesten et al. fail to teach that the inner particle is a compound oxide that includes $LiNi_{0.70}Mn_{0.30}O_2$ and $LiNi_{0.70}Co_{0.30}O_2$. The skilled artisan would recognize that the positive material of the battery of Oesten et al. would

inherently be capable of doping and undoping lithium, since such a property is essential to the function of the lithium battery.

Kawai et al. teach a positive electrode material for a battery including $LiNi_xMn_{1-x}O_2$ and $LiNi_xCo_{1-x}O_2$ ([0034]). The claims would have been obvious because the substitution of one known element for another would have yielded predictable results to one of ordinary skill in the art at the time of the invention. MPEP 2141 III.

As for the subscripts, generally differences in ranges will not support the patentability of subject matter encompassed by the prior art unless there is evidence indicating such ranges is critical. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980). In re Aller, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955). In re Hoeschele, 406 F.2d 1403, 160 USPQ 809 (CCPA 1969).

With further regard to claims 1 and 5, Oesten et al. in view of Kawai et al. fail to teach that the titanium oxide particle coating is one of those listed in the claims. Additionally, Oesten et al. fail to teach the limitation that the titanium oxide material has a spinel structure.

Spitler et al. teach the use of a lithium titanium spinel oxide ($Li_4Ti_5O_{12}$) as the positive material for the cathode of a lithium ion battery ([0001]).

Spitler et al. further teach that the lithium titanate spinel oxide allows for extremely high charge and discharge rates and a large number of charge and discharge cycles ([0022]).

With regard to the limitations concerning the homogeneity of the compound oxide, Spitler et al. teach the lithium titanate spinel oxide of the claims and do not teach the oxide being part of a mixture - it is homogenous.

It would be desirable to use the lithium titanium spinel oxide ($Li_4Ti_5O_{12}$) of Spitler et al. as the lithium oxide of the coating of Oesten et al. since the lithium titanium spinel oxide ($Li_4Ti_5O_{12}$) allows for extremely high charge and discharge rates and a large number of charge and discharge cycles.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the mixture of alkali metal compounds and metal oxides coating of Oesten et al. to include a spinel lithium titanate oxide as the titanium oxide material such as taught by Spitler et al. in order to enhance the charge and discharge rate of the electrochemical cell. Such a spinel compound is structurally stable in the electrolyte of the battery.

4. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Oesten et al. in view of Kawai et al. Spitler et al. as applied to claim 1 above, and further in view of Naruoka et al. (US 6,893,766 B2).

The teachings of Oesten et al., Kawai et al. and Spitler et al. as discussed above are incorporated herein.

Oesten et al., Kawai et al. and Spitler et al. teach the coated positive electrode active material of the instantly claimed invention, but fail to teach that the material has a mean particle diameter of 5 to 20 μm.

Naruoka et al. teach a positive active material for a secondary battery. The positive active material is lithium nickel composite oxide (col. 2 lines 45-56). The mean particle diameter of the lithium nickel composite oxide is 4 to 25 μm (col. 3 lines 44-51).

Naruoka et al. teach that if the mean particle diameter of the positive electrode active material is smaller than 4 μm, there may not be continuous contact with the electrically conductive material. Naruoka et al. also teach that if the mean particle diameter of the positive electrode active material is larger than 25 μm, the electrolyte may not penetrate the electrode material. This would adversely affect the charge and discharge rates of the battery (col. 3 lines 51-59).

It would be desirable to use make the positive active material of Oesten et al. in view of Kawai et al. and Spitler et al. having particles in the range of 4-25 μm, within which 5-20 μm falls, since particle sizes outside of that range adversely affect the charge and discharge rates of the battery, either by preventing continuous contact with the electrically conductive material or by not allowing the electrolyte to penetrate the electrode material.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to form the positive electrode active material of Oesten et al. in view of Kawai et al. and Spitler et al. having a mean particle size

Response to Arguments

5. Applicant's arguments filed November 12, 2010 have been fully considered but they are not persuasive.

Applicant argues that the prior art, specifically Oesten et al., does not teach a homogeneous coating layer. The examiner disagrees. It is clear from [0138] of Oesten et al. that the coating layer is homogeneous because it is made of only one metal oxide. In fact, in the examples described in [0141], [0144], and [0146], the coating layers are all homogeneous.

Furthermore, Oesten et al. teach that the coating layer is made from an alkali metal and a metal oxide, such as in [0138], but the final coating layer is a single lithium oxide material; the precursors to the layer are not homogeneous, but the coating layer itself is homogenous.

Conclusion

6. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL.** See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alix Elizabeth Echelmeyer whose telephone number is (571)272-1101. The examiner can normally be reached on Mon-Fri 7-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ula Ruddock can be reached on 571-272-1481. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Ula C Ruddock/
Supervisory Patent Examiner
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aee